Although Prof. Meldola has already dealt with this statement, I should like to be allowed to make a few remarks on the same subject. The most important point in the whole discussion is the question whether, in the future, it will be possible for the natural product to compete successfully with its coal-tar rival.

If the planters and their adviser, Mr. Bergtheil, can be induced to recognise and extend the results of the scientific investigations carried on in Leeds under my general supervision, I am strongly of opinion that there is still a bright future for natural indigo. The details of these investigations have been published in the Journal of the Society of Chemical Industry, and I cannot go into them again here, but I may be allowed briefly to state the main conclusions which were arrived at and confirmed in the fullest possible manner.

There can be no doubt that the indigo leaf contains much more indican than was formerly supposed to be the case, and this fact has hitherto been overlooked because of the defective analytical methods employed by the scientific advisers to the indigo planters. Mr. Bloxam and his colleagues very carefully investigated these analytical processes, and were able to prove conclusively that the persulphate method, carried out according to Mr. Bergtheil's directions, gives results which are quite untrustworthy. The first step, therefore, was to devise trustworthy analytical methods, and this was ultimately accomplished by the development of the isatin method for determining the indican in the leaf and the tetrasulphonate method for estimating the indigo in the finished cake. A very large number of control analyses, carried out under a great variety of conditions, have shown conclusively that these analytical methods are the only ones which give accurate results. The application of these new methods has proved beyond doubt that there is much more indican in the leaf than is converted into indigo under the present conditions of manufacture. In spite, therefore, of the statement of the general secretary of the Bihar Planters' Association that "nothing further can be done in improving the main processes," I am convinced that there is a great prospect of considerably increasing the yield of indigo provided all the details of manufacture are systematically subjected to searching and skilful scientific investigation.

A. G. PERKIN.

Memory in the Germ-plasm.

IF "a lamb's tail is shortened" and the germ-cell "records" the event, surely there is more to be "remembered" by it than a "momentary cut," viz. a permanent change of shape? Setting aside mutilations, there remain use-acquirements. From infancy forwards a man develops physically and mentally, principally under the stimulus of use. For instance, the muscles of an infant's limbs do not grow unless used. His mind is almost blank at birth, but grows under the influence of experience (use). In this way he learns to coordinate his muscles and a vast deal more. Prolonged parental protection affords the opportunity. In proportion as animals are low in the scale of life they appear to be less and less capable of making use-acquirements until they are quite incapable. Most insects, for example, are not protected by their parents, and must come into the world fully equipped physically and mentally to cope with the environment. They have no need for use-acquirements, and apparently make none. It seems clear, then, that the power of developing under the stimulus of use (plasticity, as it is called) is a product of evolution. It confers the immensely valuable trait of adaptability on the individual. The position, then, appears to be this: low animals cannot make use-acquirements, and therefore can transmit none; higher animals can make use-acquirements, but obviously transmit none, for in them the innate has been progressively replaced by the acquired. When we speak of the transmission of a use-acquirement, we do not really mean that the child has inherited the parental trait—we mean that the trait has been *transmuted* into something very different and much less useful, an innate character. In other words, we suppose that the adaptability of the parent is replaced by rigidity in the child, and we suppose this in spite of enormous and conclusive evidence to the contrary. We close our eyes carefully to facts, and found our science on vague analogies.

Southsea, October 9. G. ARCHDALL REID.

A Red Rainbow at Sunset.

OCTOBER 9 was a mild day with south-west wind, and slight showers in the afternoon. The sky was overcast until sunset, when breaks appeared in the clouds. In the west there was a fine effect of orange-yellow sunset colour, while in the south-east at the same time the clouds were pink. Here, on some pink clouds near the horizon, a fine, nearly vertical patch of rosy-red rainbow appeared, which shone more brilliantly, and was of a rather yellower red than the surrounding clouds. The colour, varying in intensity, lasted for about three minutes, and the patch appeared to be from 10° to 12° in length; the occurrence took place about 5h. 30m. G.M.T. A similar rainbow is described in the current number of the *Gazette astronomique*.

E. ARMITAGE.

Dadnor, Herefordshire, October 10.

OXFORD UNIVERSITY MUSEUM.

THE fiftieth anniversary of the opening of the Oxford University Museum was celebrated on Thursday last, and a large number of distinguished men of science, representing the universities and scientific societies and institutions of Great Britain and Ireland, assembled to do honour to the occasion. The proceedings were short, and may be very shortly described. The guests assembled in the Sheldonian Theatre, where the honorary degree of Doctor of Science was conferred on Prof. Svante Arrhenius and Mr. A. G. Vernon Harcourt. Fifty years ago Mr. Harcourt was acting as Brodie's lecture assistant, and was engaged in setting up the apparatus for the first lectures delivered in the new museum. Hearty congratulations were tendered by those present on his unimpaired vigour and energy after so many years' active and distinguished scientific work. After receiving congratulatory addresses from universities and learned societies, the Vice-Chancellor read a letter from the Chancellor, and delivered an address which was singularly felicitous both from its style and from the evident sincerity with which he expressed his sympathy with the progress of scientific studies in the University of Oxford.

In the afternoon Dr. Vernon Harcourt gave an address on the early history of the museum. It was unfortunate that the lecture theatre of the museum was too small to accommodate a larger audience. Many were unable to gain admittance, but those who were more fortunate had the privilege of hearing an interesting story luminously told, and enlivened by many humorous passages and personal reminiscences. After Dr. Harcourt's address, the Vice-Chancellor unveiled a bust of the late Prof. W. F. R. Weldon, and the company dispersed to tea and to visit the various departments of the museum.

Though, as the Vice-Chancellor said in his address, fifty years is not a long period in the history of education nor in the history of the University of Oxford, it was fitting that this anniversary should have been commemorated. The building of the Oxford Museum was an indication of a great change in the opinions of educated men in this country, and it is probable that half a century hence the present time will be looked back upon as equally important in the history of the progress of scientific education. In our opinion, too much stress has been laid upon the opposition to the project of building the University Museum; too little credit has been given to the large and enthusiastic support which enabled the project to be realised.

©1908 Nature Publishing Group

It must not be supposed that Oxford was entirely destitute of scientific collections or of scientific professors and readers in the earlier part of the nineteenth century. The Ashmolean Museum, housed in the beautiful building designed by Wren, contained a considerable number of natural history specimens as well as objects of antiquarian interest, and though it had suffered neglect in the eighteenth century, it had been largely added to by the indefatigable zeal of J. S. and P. B. Duncan since 1823. There were collections of geology and mineralogy in the Clarendon building. Dr. Kidd and the late Sir H. Acland had formed an important anatomical collection at Christ Church, on the model of the Hunterian Museum. Dr. Daubeny had equipped a private house near Magdalen College as a laboratory. The Botanic Garden at Oxford is one of the oldest of its kind. But university laboratories and lecture rooms can hardly be said to have existed, and if they had existed they would not have been filled, for there were no inducements to the study of natural science. In the earliest years of the nineteenth century Oxford had reformed herself. The system of honour examinations was instituted in 1801, and the colleges bestirred themselves to improve and systematise their methods of teaching. But the only subjects recognised in the final schools were "Literæ humaniores" and mathematics; for these exclusively college tuition was provided, and to these subjects alone were allotted all the profits and honours that the colleges could give. The advance in efficiency was no doubt considerable, but it took a direction hostile not only to scientific but to every kind of professorial teaching. Each college undertook to provide for all the intellectual wants of its members, and was jealous of outside interference. As the tutorial influence grew, the professorial influence waned, and the audiences of the scientific professors and readers in particular, if they existed at all, consisted chiefly of graduates who took a *dilettante* interest in natural phenomena.

When the exclusive interests of the colleges are considered, it is a remarkable instance of the liberal spirit prevailing in Oxford before the days of University Commissions that the Honour School of Natural Science was established by vote of Convocation in 1849, and that a large sum of money was shortly afterwards contributed by the University and by private individuals to the building of a museum and laboratories which would be independent of college influence. It is interesting to note that, among many others, Mr. Gladstone's name stands as a contributor of 100*l.* towards the museum building fund, and Dr. Pusey's name as a contributor to the internal decorations. Looking over the records, one cannot but be struck with the large amount of sympathy and practical help given by men whose interests in life lay in very different directions. Equally striking are the high ideals and noble conceptions of those who guided the course of affairs. The new museum was designed to include all the branches of natural science under a single roof, and thus to symbolise the unity of science. Great care was taken that the site and architectural features of the new building should be dignified; that the interior should be enriched with carving; that the history of science should be illustrated by statues of the great men of ancient and modern times. It is well known how Ruskin threw himself into the work and invested it with a poetical fancy which, if detrimental in some respects to the practical requirements of scientific laboratories and exhibitions, is not without value and influence at the present day. Lack of money prevented the completion of the enrichments originally designed, but in very recent years the generosity of the Rev. H. T. Morgan has provided for the carving of the capitals of the pillars of the south and east sides of the central court.

If Oxford was first in the field, it must be confessed that science has not made such rapid strides there as in other universites during the half-century that has elapsed since the museum was first opened. But the progress has been great, though retarded by influences the force of which has only gradually abated in the period. There can be little doubt that the highly elaborated system of college tuition, always more conspicuous at Oxford than at Cambridge, has been a retarding influence. Admirable as it is in many ways, this system has the effect of making colleges reluctant to allow their undergraduates to escape from their immediate influence. College tutors said that when their men went to the museum they lost sight of them. Hence, for many years, they discouraged their going there. As time went on, and it became evident that there was a real demand for scientific teaching, the colleges began to build and equip scientific laboratories of their own; mostly chemical laboratories, in response to the great demand for chemical instruction. Thus it has come about that a great part, probably the larger part, of the chemical teaching in the university is not conducted at the museum, but elsewhere. If this is theoretically disadvantageous, the college lecturers, by organising their courses in combination with the chemical department at the museum, have contributed very largely to the recent rapid progress of chemical science in Oxford, and, further than this, they have been the agents in spreading a real and active interest in scientific studies among all classes in the University. Year by year individual colleges come forward with proposals to endow scientific professorships in subjects insufficiently represented in the University. It would be invidious to particularise, and it would take too much space to enumerate all that has been done by different colleges in this direction in recent years, but special mention may be made of St. John's College, which, after re-endowing the Sibthorpian chair of rural economy, at its own expense has built and equipped laboratories and lecture rooms for the use of the professor.

But the most fundamental and certainly the most encouraging feature in the changed estimate of the value of scientific training in Oxford is due very largely, as the Vice-Chancellor pointed out, to the example set by science itself. By slow degrees the University has come to recognise the value of research. Not long since examinations and preparation for examinations absorbed the whole interest of college staffs. Success in examinations was the only road to a fellowship. In the last few years many colleges have so amended their statutes that they are able to elect a large proportion of research fellows, and have amply availed themselves of their new opportunities. New ideals and new opportunities have arisen, not only in natural science, but in all branches of learning, and the immediate effect, so far as science is concerned, is that emulation has taken the place of opposition.

Thus the celebration of the fiftieth anniversary of the museum marks, not the dawn, but the establishment of a new era. The progress of scientific studies depends more upon sympathy and good will than on laboratories and equipment, indispensable though the latter may be. Those who visited Oxford last week could easily take note of the numerous additions to the departments of the museum and satisfy themselves that the material for scientific work is not lacking. They could satisfy themselves with equal ease of the energy and enthusiasm of the scientific staff, but the spirit of the whole University is more difficult to discern. It should be noted, therefore, that the

©1908 Nature Publishing Group

Vice-Chancellor's address, which faithfully reflected the opinion of the great majority of resident graduates of the University, was one of the most satisfactory features of the day's proceedings. Nor was evidence lacking that where high ideals and earnest effort are present material assistance is soon forthcoming. The pathological department was largely built and equipped by private generosity, and the Drapers' Company, to whom the University is already indebted for a beautiful and commodious building for housing the Radcliffe library of scientific works, has undertaken to defray the expense of a new electrical laboratory for the use of the Wykeham professor of physics.

All well-wishers of Oxford may join in congratulating her on what she has already achieved, and not less on the abundant promise of future achievement.

MEASUREMENTS OF THE CHINESE.

WE have received from Mr. A. H. Crook, Queen's College, Hong Kong, average measurements of various dimensions of Chinese boys and youths between the ages of ten and twenty-four years, the most important of which we give below. The British Association averages for English boys of the same age, so far as they are available, are printed beneath the corresponding Chinese measurements. Mr. Crook points out an interesting difference in the growth curves of weight and height of the two races.

MEASUREMENTS OF CHINESE BOYS.

Ages	10	11	12	13	14	15	16	17	18	19	20	21	22	23
No.	3	6	15	27	55	95	133	112	98	63	34	12	3	3
Weight.														
Chinese	64·2	66·2	73·6	78·7	90·9	97·6	101·6	106	108·9	114·4	113·4	115·3	116·7	100·1
English	67·5	72·6	76·7	82·6	92	102·7	119	130·9	137·4	139·6	143·3	145·2	146·9	147·8
Height.														
Chinese	54·1	54	56	59·6	62·2	62·9	63·5	64·2	64	65·7	65·6	65	64·6	62·4
English	51·8	53·5	55	56·9	59·3	62·2	64·3	66·2	67	67·3	67·5	67·6	67·7	67·5
Chest (Normal).														
Chinese	24·8	24·6	25·6	26	27·5	28·7	29	29·3	30·1	30·3	30·5	30·5	31·3	29·7
English	26·1	26·5	27·2	28	28·5	29·7	31·5	33·6	34·19	34·5	35	35·2	35 3	35·6
Chest (Expanded).														
Chinese	26 8	26·3	27	27·8	29·3	30·3	30·8	31·4	31·8	32·1	32·2	31·6	33·2	31·4
Neck (Circumference).														
Chinese	10·3	10·4	11	11·2	11·8	12·2	12·5	12·7	13	13·2	13·1	13	13·3	12·9
Wrist (Circumference).														
Chinese	4·8	4·6	5	5	5·3	5·4	5·6	5·7	5·6	5·7	5·7	5·7	5·8	5·7
Hips (Circumference).														
Chinese	27·1	26	27	27·3	29·3	30·2	30·7	31·1	31·7	32	32	31·6	32·2	31·2

From the figures it will be seen that Chinese boys, though lighter in weight, are taller than English boys up to the age of sixteen. After that the stature of the English boy increases much more rapidly than that of the Chinese boy. Mr. Crook thinks that this important difference is due to the fact that the Chinese boy takes much less exercise than the English boy after the critical age. It may be partly due to that, but it is highly probable that the greater part of the difference is racial. Mr. Crook remarks on the small amount of chest expansion of the Chinese, but the 2 inches which he usually obtains is little, if any, short of English and French normals. Mr. Crook's measurements are of considerable value, and it is much to be desired that Englishmen residing among little-known races should imitate his example.

MOSQUITOES AND PEAT.

THE likes and dislikes of mosquitoes are so multifarious that one may never be surprised at anything in their bionomics. Some prefer to live in their larval stages at the edge of weedy pools and rivers, some in clear pools, others in such artificial collections of water as are to be found in old sardine tins, calabashes, cisterns, rain-water barrels, and tanks on board steamers, even the liquid in the pitcher plants forms a breeding ground, and yet others occur in the water held up in cut and insect-damaged bamboos. Each species seems to have its own particular place to live.

A recent letter in the *Times* refers to the absence of mosquitoes in swamps and marshes with peat. The writer, "Many Lands," says:—"Given marshy lands and no peat mosquitoes abound, given marshy land and peat there are none." This may be true where the writer has been, and in many other places, but it is not a universal rule. It must certainly depend on what species the mosquitoes are, for we have found such as *Anopheles nigripes,* Staeg., and *Anopheles bifurcatus,* Linn., breeding in the water of peat cuttings in Wales and Somerset, and on the far-famed Wicken Fen numbers of *Culex cantans,* Meigen, in the waters there. Mosquitoes are often very abundant in the fens, even where the peat is dug. Besides these, we have found *Anopheles maculipennis,* Meig., and *Theobaldia annulata,* Meig., in peaty water and near peat piles in North Wales. In America Smith records that the mosquito larvæ are few where sphagnum swamps abound, and we may find that peat areas are similarly not favourable to certain mosquitoes. Nothing definite is known of this subject. It would not be waste of time to try if a few blocks of peat thrown into a pool or artificial collection of water would destroy the larvæ, but from what we have seen of at least five of our twenty-two British Culicidæ it seems doubtful if it would do so.

Towards the end of the letter in the *Times* the writer says, "for of course mosquitoes cannot breed in salt water."

This statement is quite incorrect, for many do so. Take Australia alone, and we find three species

©1908 Nature Publishing Group